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NORTH CAROLINA BOARD OF HEALTH

Limitation and Prevention

OF

DHIPTEHERIA.  
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By R. L. PAYNE, M. D.

RALEIGH:

P. M. HALE, and EDWARDS, BROUGHTON & CO.,  
State Printers and Binders.

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LIMITATION AND PREVENTION  
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DIPHTHERIA.

By R. L. PAYNE, M. D.

In consideration of the fact that diphtheria has been prevalent in many sections of North Carolina at various times since the year 1861, bringing suffering, death and woe to many a happy household; and because it is again committing its ravages in some parts of the State, the State Board of Health deem it their duty to publish the following circular, hoping thereby to admonish every citizen not to neglect any precautions which may be calculated in the least degree to prevent the spread of the disease, and hoping to impress every one with the possibility of limitation and prevention.

While there are some things still unknown, and unsettled as to diphtheria, its law of contagion and its spontaneous origin, yet a sufficient number of facts respecting its prevention have been deduced from the very large experience which has been accumulating for the last eighteen or twenty years in this country, to warrant the publication of the best known of them.

**Contagion.** Is diphtheria contagious? This is still a mooted question, and, while some good observers deny it, the weight of testimony is very largely in favor of it. From a large experience with, and close observation of, the disease in different epidemics, we cannot for a moment doubt its contagiousness, and we hope that in our present state of knowledge *no theories, however plausible*, will be suffered to

beguile the householders of our State into the belief of its non-contagiousness. If we be still to some extent in the dark, as a matter of prudence let us hold fast to the safer side until the dawn of greater light.

It is true that the contagiousness of diphtheria differs essentially from the more familiar examples of it in measles, small-pox, whooping-cough, scarlet fever, etc. In these diseases the time which elapses from contact with the person affected, and the seizure of the person exposed, is fixed and well known, so that we can speak definitely of the laws which govern them; but our knowledge of diphtheria is not yet so definite. However, it is confidently believed that it will be shown in the future to have its fixed period of incubation too.\*

The first manifestations of the disease are nearly always either in the throat, nose, or mouth, and this would seem to indicate that the causative elements invade the body through these most exposed channels, leading to the inevitable conclusion that the breath of diphtheria patients is dangerous, and that the contagious elements may be conveyed in the air. It is a zymotic, or constitutional disease,—that is, the blood is always poisoned in those affected with it. An eminent writer, speaking of it says:

“Zymotic in its nature it tends to fasten upon whomsoever is debilitated by previous disease, or by a constitution naturally feeble, and artificially effemинized, or whose vitality is lowered by the depressing influences of luxury, indolence and inactivity; and the habitual defiance of physical and hygienic laws, \* \* \* \* \* Finally, all we can affirm is that, as a general rule, anti-hygienic conditions of any kind favor the invasion of diphtheria, as well as of other similar epidemic diseases.”

Unlike most other specific diseases, one attack does not

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\*The writer was attacked with diphtheria just a week after a piece of membrane from the throat of a patient came in contact with the mucous membrane of his own mouth.

exempt the person from subsequent attacks, but appears rather to render such a one more liable to be smitten again. Consequently the cautions which follow are as applicable to these persons as to those who have never had the disease.

### LIMITATION.

Can any means be resorted to which will in any measure prevent or even limit the spread of this terrible scourge? We believe this question may be safely answered in the affirmative, since already most encouraging results have followed such attempts in various localities. Therefore, we believe it to be our bounden duty as philanthropists to *redouble our efforts in this direction!*

It has been shown (as far as our enquiries have extended,) that in the Southern States, the season of the greatest prevalence and malignancy of diphtheria, is during the time of the greatest soil-soakage, that is, during and after the usual autumn rains. The connection between the appearance and spread of this disease, and the soil saturated with rain, and holding in solution all of the foul washings from the surface of the earth, as fecal matter, decomposing vegetable matter, garbage, &c., has not yet certainly been established, but enough is known to lead to the belief that there is some connection. Of course, the same soil-soakage, etc., existed in North Carolina before diphtheria became epidemic, and did not beget the disease. Once introduced, however, and having this pabulum to feed upon, it spread from house to house, and we have no doubt that such a condition of foul decomposition tends materially to promote its spread, yet we freely grant that we have seen many a severe case of diphtheria during the prevalence of dry weather.

Our confrére, Thomas F. Wood, Secretary of the State Board of Health, has prepared a very excellent diagram of the death rate of diphtheria in Wilmington, N. C., from which it appears that the greatest death rate in that city

happened about and soon after the seasons of the greatest rain-fall, and most extreme heat.\*

**Drainage.** What we say of drainage is applicable to all infectious diseases. Perfect drainage is the precedent condition of prevention in all of them. A badly drained city, town or locality, runs risks which are proportionate to the inefficiency of its plan of drainage. The soil of any situation which is soaked with stagnant water, is sure to be soaked with foul water, and all water which is rife with animal and vegetable decomposition, is a most prolific hot-bed of infectious diseases.

One of the paramount conditions then, of pure water, is that it shall have free circulation, shall flow freely, and one of the essential conditions of harmless soil, is that it shall have a free circulation of ground air. Thorough drainage, therefore, becomes a most potent factor in limiting the spread of diphtheria, and should never be neglected.

**Ventilation** in and under dwellings should be secured and made effectual, because nothing contributes more to good health than pure air! Pure water, pure air, and a plenty of sunlight are of the utmost importance in a hygienic point of view. As much sunshine as possible should be let into the damp shady corners, and such places as cannot be remedied by drainage should be frequently covered with unslaked lime, charcoal or solutions of green vitriol.

**Well or Spring Water** must not be used if there be any reason to suppose that the water is impure, unless there be no other source of water supply, and even then that for drinking purposes should be boiled before using. *All wells or springs near a privy should be suspected, because although we may not be able to detect anything wrong either by taste or smell, such water is very probably most impure.* Ditches and drains should be so constructed that all the surface washings shall be carried as far as possible away from

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\* See Dr. Wood's paper and diagram in the N. C. Medical Journal for March, 1878.

wells and springs, and the habit common in some parts of the State of allowing children to urinate, and sometimes, even empty the bowels behind the well-house, or near the well or spring, should be immediately abandoned, since these excrementitious matters are washed into the well or spring by the rains, and thus become fruitful sources of disease.

**Your Privy** should be carefully attended to. Destructive deodorants, such as unslaked lime, copperas water, ( $1\frac{1}{2}$  lbs. to the gallon of water,) or if nothing better is at hand, common wood ashes should be applied every day, or at least every other day. Dry earth may be used for the same purpose, but is not so effectual, because it cannot penetrate deep into the mass.\*

### **DIPHTHERIA IS A DISEASE DANGEROUS TO THE PUBLIC HEALTH.**

Therefore the County Superintendent of Health should be notified as soon as a case occurs in the county.

### **AVOID THE CONTAGION.**

In the first place, all persons should endeavor to keep out of the way as much as possible; and secondly, all persons sick with the disease should be promptly separated from the rest of the family and the public, and should have no one about them *except such as are absolutely necessary*. Carpets, curtains, and all other textile fabrics not necessary, should be removed at once. Bare floors are to be preferred, and windows without curtains let in needed sunlight. Fresh air should be freely admitted into the room of the sick, care being taken not to expose the patient to draughts, and a fire should be made morning and night, and in damp weather

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\*See Circular on Drainage, Ventilation, Water Supply and Disinfectants.

should be kept burning all the time, because a fire dries up the dampness, and promotes the circulation of pure air.

### **ALL DISCHARGES FROM THE PATIENT**

Should be carefully destroyed. Those from the nose, throat and mouth may be received upon soft rags, and these should not be suffered to accumulate, but should be burned soon after using. The evacuations from the bowels and bladder should be received in vessels and immediately disinfected with sulphate of zinc, chloride of zinc, copperas, or some other destructive disinfectant, and then be buried as far as possible from the well. *Perfect cleanliness of patient, nurses, floors, furniture, clothing, utensils, etc., etc., should be scrupulously attended to!* The bed-clothing, and the clothing of the patient, must be often changed, and those taken off should be immediately put to soak in water having in solution chloride of zinc or chloride of lime, and allowed to remain in soak several hours. Spoons, cups, and all other utensils used by the patient, should be cleansed in the room, and be confined entirely to the use of the sick, and the dish-water, after being disinfected, should be buried with the excrement.

The condition of the yard, garden, stable-lot, and all other surrounding lots should be frequently inspected, and all garbage, and filth of every description carefully removed, or destroyed by being well covered with unslaked lime or dry earth.

The kitchen, smoke house, poultry-house, pig-sty, and stables, should be kept as free from filth as possible, and all such out-houses should never be built near the well or spring. Cellars should be kept clean and dry, and have plenty of sunlight. The slop-tub should not be suffered to become a nuisance.

## VISITORS TO THE ROOM OF THE SICK

Should be limited to the physician, and the nurses. All others will be in the way, and might be the means of spreading the disease. CHILDREN SHOULD NOT BE ALLOWED TO GO NEAR ONE SICK WITH DIPHTHERIA; and during the prevalence of the disease, at least, the foolish custom of kissing should be prohibited. Even with these restrictions the well children of the household where there is diphtheria should not go to school, or visit other children.

## CONVALESCENT PATIENTS

Should be considered dangerous as regards the possibility of conveying the disease, and should not attend church, school, or any public assembly, and should not visit other children until some competent physician declares it safe for them to do so.

## FUNERALS.

Public funerals of those dying with diphtheria should be discountenanced. *In truth, such funerals should be made as private as possible.* Only those who are necessary to bury the dead decently should follow the body to the grave. Kissing the dead body, however much the custom, should be abandoned. The pall-bearers, if any are chosen, should be from among grown persons, for as in this disease one attack affords no immunity from a second, of course it would be impossible to select persons not liable; but the nearest approach to this will be in selecting grown men as being least liable.

The body should be buried without unnecessary delay, and it is advisable that it should be taken from the room in which the death occurred to the cemetery, thus obviating the chances of infecting any other room.

After a death or recovery from diphtheria, the room in

which the patient has been confined, as well as all clothing, towels, etc., used, should be thoroughly cleansed and disinfected.

All articles of apparel, bed-clothing, towels, etc., should be spread out so that the greatest amount of surface may be exposed, and every opening to the room securely closed, so that the fumes of the disinfectant may not escape. We believe one of the cheapest and best disinfectants to be used in rooms infected with diphtheria, is sulphurous acid gas, and this may be readily generated by putting live coals of fire into a common iron pot already partly filled with ashes, and then sprinkling sulphur in powder, or in small particles upon the coals. The room should be subjected to this fumigation for several hours, and afterwards thoroughly aired by opening all of the doors and windows. "A pound and a-half of sulphur is sufficient for 1,000 cubic feet of space." If chlorine be preferred, take four ounces of the peroxide of manganese, place it in an earthen dish or crock, and add to it one pound of muriatic acid. Used in this way, chlorine will be evolved, and the process may be repeated as often as necessary. Care must be taken not to inhale either of these gases.

For further directions upon disinfectants, the reader is referred to Circular on Ventilation, Drainage, Drinking Water, and Disinfectants.\* *We believe that if the foregoing precautions are strictly observed, the spread of diphtheria will be greatly limited, if not entirely prevented.*

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\*The writer is greatly indebted to Dr. Thomas F. Wood for his MS notes on diphtheria, which have been freely used in the preparation of this paper.



